

Appl. No. 10/801,404

Reply to Office action of July 22, 2004

Amendments to the Claims:

Claim 1 (original) A method for processing a workpiece in a workpiece processing apparatus comprising the steps of:

grasping a first workpiece between first and second rotatable catch mechanisms on a first side of a workpiece handling end-effector;

positioning the first workpiece in alignment with the workpiece processing apparatus;

rotating the first and second rotatable catch mechanisms to an open position to ungrasp the first workpiece and to raise the first workpiece into contact with the workpiece processing apparatus;

processing the first workpiece in the workpiece processing apparatus;

while processing the first workpiece, grasping a second workpiece between the first and second rotatable catch mechanisms on the first side of the workpiece handling end-effector;

positioning the workpiece end-effector below the workpiece processing apparatus with a second side of the workpiece end-effector aligned with the workpiece processing apparatus and with third and fourth rotatable catch mechanisms on the second side of the workpiece end-effector rotated to an open position;

transferring the first workpiece to the second side of the workpiece end-effector and rotating the third and fourth rotatable catch mechanisms to a closed position to grasp the first workpiece;

rotating the workpiece end-effector by 180° to align the second workpiece with the workpiece processing apparatus; and

rotating the first and second rotatable catch mechanisms to an open position to ungrasp the second workpiece and to raise the second workpiece into contact with the workpiece

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processing apparatus.

Claim 2 (original) The method of claim 1 wherein the step of processing the first workpiece comprises the step of chemical mechanical planarizing the first workpiece.

Claim 3 (currently amended) The method of claim 1 further comprising the step of centering the first workpiece on the workpiece end-effector between rotatable rocker assemblies after the step of rotating the first and second rotatable catch mechanisms to an open position to ungrasp the first workpiece.

Claim 4 (original) The method of claim 3 further comprising the step of contacting the workpiece processing apparatus with the rotatable rocker assemblies to cause rotation of the rotatable rocker assemblies.

Claim 5 (original) An end-effector for gripping a semiconductor wafer at its edge, comprising:

- an elongated gripping assembly having a first end adapted for attachment to a controllable robot, and a second end opposite the first end;
- a first actuated wafer edge clamping assembly proximate the first end of the gripping assembly, and moveable between an open position and a wafer clamp position;
- a second actuated wafer edge clamping assembly proximate the second end of the gripping assembly, and moveable between an open position and a wafer clamp position; and
- a wafer centering mechanism configured to position a semiconductor wafer when the first actuated wafer edge clamping assembly and the second actuated wafer edge clamping

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assembly are in the open position.

Claim 6 (currently amended) The end-effector of claim 5, further comprising an actuator system for simultaneously actuating the ~~first and second wafer edge clamping devices~~ first actuated wafer edge clamping assembly and the second actuated wafer edge clamping assembly.

Claim 7 (original) The end-effector of claim 6, wherein:

the first wafer edge clamping assembly comprises a first pivotable catch mechanism configured to rotate about a first axis coupled to the first end of the gripping assembly; and

the second wafer edge clamping assembly comprises a second pivotable catch mechanism configured to rotate about a second axis coupled to the second end of the gripping assembly.

Claim 8 (currently amended) The end-effector of claim 7, wherein the actuator system for simultaneously actuating the ~~first and second wafer edge clamping devices~~ first actuated wafer edge clamping assembly and the second actuated wafer edge clamping assembly comprises a rod connected to each of the first and second pivotable catch mechanisms.